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Volume V
Part 36




# INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)
## Volume V - Common Data Model Subsystem
## Part 36 - DDL to NDDL Translator Test Plan

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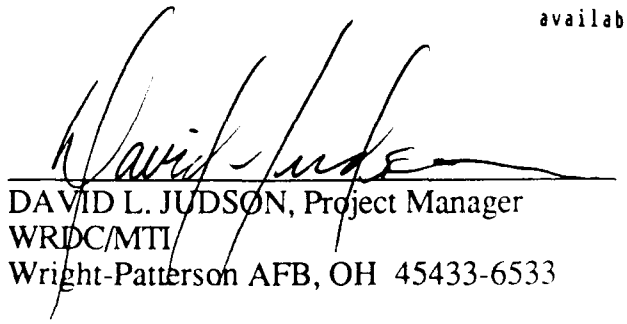

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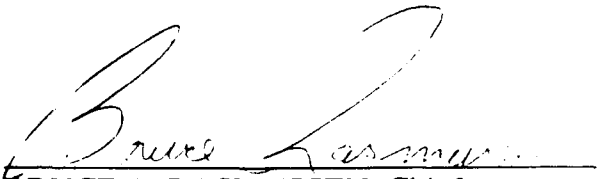

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This unit test plan establishes the methodology and procedures used to adequately test the capabilities of the DDL to NDDL Translator computer program.

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## FOREWORD

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The DAPro project was created to continue the development, test, and demonstration of the Integrated Information Support System (IISS). The IISS technology work comprises enhancements to IISS software and the establishment and operation of IISS test bed hardware and communications for developers and users.

The following list names the Control Data Corporation subcontractors and their contributing activities:

| SUBCONTRACTOR | ROLE |
|---|---|
| Control Data Corporation | Responsible for the overall Common Data Model design development and implementation, IISS integration and test, and technology transfer of IISS. |
| D. Appleton Company | Responsible for providing software information services for the Common Data Model and IDEF1X integration methodology. |
| ONTEK | Responsible for defining and testing a representative integrated system base in Artificial Intelligence techniques to establish fitness for use. |
| Simpact Corporation | Responsible for Communication development. |

| | |
|---|---|
| Structural Dynamics Research Corporation | Responsible for User Interfaces, Virtual Terminal Interface,and Network Transaction Manager design, development, implementation, and support. |
| Arizona State University | Responsible for test bed operations and support. |

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# SECTION 1

# GENERAL

## 1.1 Purpose

This unit test plan establishes the methodology and procedures used to adequately test the capabilities of the computer program identified as the DDL to NDDL Translator known in this document as the Translator. The Translator is one configuration item of the Integrated Information Support System (IISS).

## 1.2 Project References

[1] ICAM Documentation Standards, IDS 150120000C, 15 September 1983.

[2] D. Appleton Company, CDM Administrator's Manual, UM 620341000, 31 May 1988.

[3] D. Appleton Company, CDM1, An IDEF1 Model of the Common Data Model, CCS 620341000, 31 May 1988.

[4] Control Data Corporation, Neutral Data Definition Language User's Guide, 1 Nov., 1987.

[5] C. J. Date, An Introduction to Database Systems, 1977, Addison-Wesley Publishing Company, Inc.

[6] IBM, DATABASE 2 Reference release 1.0, December 1984, IBM.

[7] Cincom Systems, TOTAL Database Administration Reference Manual, release 8.1 1978, Cincom Systems.

[8] Structural Dynamics Research Corporation, DDL to NDDL Translator User Manual, UM 620341410, 31 May 1988.

[9] Structural Dynamics Research Corporation, DDL to NDDL Translator Development Specification, DS 620341410, 31 May 1988.

## 1.3 Terms and Abbreviations

Application Interface: (AI), subset of the IISS User Interface that consists of the callable routines that are linked with applications that use the Form Processor or Virtual Terminal. The AI enables applications to be hosted on computers other than the host of the User Interface.

Application Process: (AP), a cohesive unit of software that can be initiated as a unit to perform some function or functions.

Common Data: (CD), all the data of an enterprise.

Common Data Model: (CDM), IISS subsystem that describes common data of an enterprise and includes conceptual, external and internal schemas and schema transformation operators.

Common Data Model Administrator: (CDMA), the person or group of persons responsible for creating and maintaining an enterprises's Common Data Model. The CDMA manages the common data rather than managing applications that access data.

Common Data Model Processor: (CDMP), a component of the Common Data Model subsystem which is the distributed database manager of the IISS.

Conceptual Schema: (CS), the standard definition used for all data in the CDM. It is based on IDEF1 information modelling.

External Schema: (ES), an application's view of the CDM's conceptual schema.

Forms Processor: (FP), subset of the IISS User Interface that consists of a set of callable execution time routines available to an application program for form processing.

Integrated Information Support System: (IISS), a computing environment used to investigate, demonstrate, test the concepts and produce application for information management and information integration in the context of Aerospace Manufacturing. The IISS addresses the problems of integration of data resident on heterogeneous data bases supported by heterogeneous computers interconnected via a Local Area Network.

Internal Schema: (IS), the definition of the internal model, the storage structure definition, which specifies how the physical data are stored and how they can be accessed. It is represented in terms of the physical database components, including record types and inter-record relationships.

Network Transaction Manager: (NTM), IISS subsystemthat performs the coordination, communication and housekeeping functions required to integrate the Application Processes and System Services resident on the various hosts into a cohesive system.

Neutral Data Definition Language: (NDDL), A language used to manipulate and populate information in the Common Data Model (CDM) or IISS System Database.

Neutral Data Manipulation Language: (NDML), A language developed by the IISS project to provide uniform access to common data, regardless of database manager or distribution criteria. It provides distributed retrieval and single node update.

Presentation Schema: (PS), The totality of the form fields in an application which are targets of data derivative from the common data.

User Interface Monitor: (UIM), part of the Form Processor that handles messaging between the NTM and the UI. It also provides authorization checks and initiates applications.

# SECTION 2

# DEVELOPMENT ACTIVITY

## 2.1 Statement of Pretest Activity

During system development, the computer program was tested progressively. Functionality was incrementally tested and as bugs were discovered by this testing, the software was corrected.

This testing was conducted by the individual program developer in a manual mode. Any errors were noted by the developer and corrections to the program were then made after a testing session.

## 2.2 Pretest Activity Results

Testing of the forms discovered a few minor bugs which were then corrected and retesting proved successful. Testing included exceptional conditions (such as syntax errors). The overall test results during development showed no major programming errors. Only minor bugs were discovered and corrected.

# SECTION 3

# SYSTEM DESCRIPTION

## 3.1 System Description

This system is to be used to accomplish the translation of the native Data Definition Language (DDL) for DATABASE 2 and TOTAL data base management systems into the IISS Neutral Data Definition Language (NDDL) for the creation of the internal schema (IS) specification for the Common Data Model (CDM). The Translator consists of several translators, one for each DDL which must be translated to NDDL. Each translator differs only in its lexical anaylzer and parser and to avoid confusion this document will refer to these translators collectively as "the Translator".

Figure 3-1 describes the structure of the Translator interfaces.

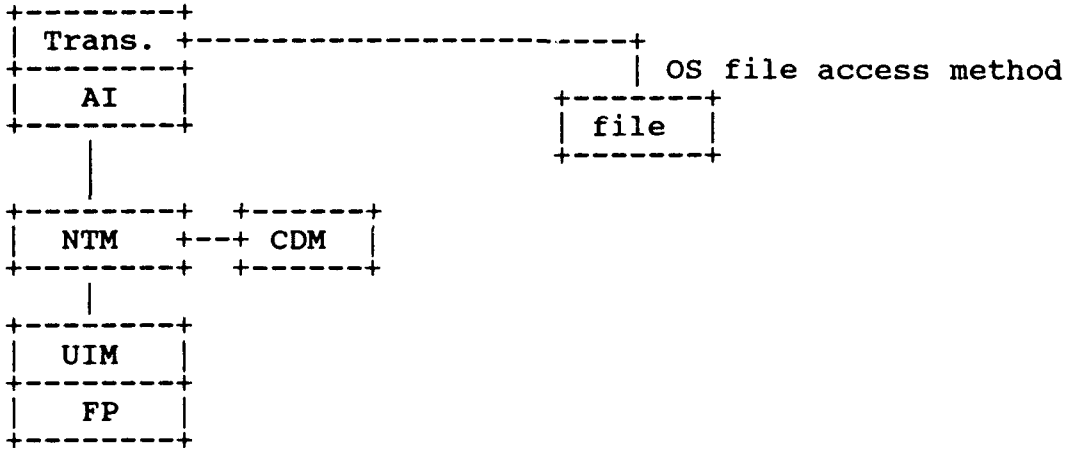


Figure 3-1 Translator Interfaces

## 3.2 Testing Schedule

The execution of the Translator is dependent upon the NTM, CDM, and UI and must be tested after them.

## 3.3 First Location Testing

These tests of the Translator require the following:

Equipment: Air Force VAX, terminals supported by the virtual terminal as listed in the UI Terminal Operator's Guide.

Support Software: The Integrated Information Support System, and the Oracle database management system.

Personnel: One integrator familiar with the IISS.

Training: The Translator User Manual has been provided with the current release.

Deliverables: The Translator subsystem of the IISS CDM TOOLS.

Test Materials: This test is interactive and can be manually performed as outlined in this test plan. It also could be run as a script file if so desired.

Security considerations: None.

## 3.4 Subsequent Location Testing

The requirements as listed above need to be met; however, in subsequent testing it is advantageous to create a script file of the outlined tests and run this saving the output of the test for future comparisons. The script file, TRANUTP.SCP is under IISS Configuration Management.

# SECTION 4

# SPECIFICATIONS AND EVALUATIONS

## 4.1 Test Specification

The following NDDL statements (that we generate) are demonstrated by the outlined tests:

| Functional Requirements | Test Activity A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Translate "DB2 Create Database" statement to NDDL "Define DB2 database" statement | * | | | | | |
| Translate "DB2 Create Table" statement to NDDL "Define DB2 Table" statement | | * | | | | |
| Translate "DB2 Comment On" statement to NDDL "Describe" statement | | | * | | | |
| Translate "TOTAL DATA-BASE_GENERATION" statement to NDDL "Define TOTAL Database" statement | | | | * | | |
| Translate "TOTAL DATA-SET-NAME" statement to NDDL "Define TOTAL Record" statement | | | | | * | |
| Translate "TOTAL LK" fields to NDDL "Define TOTAL Record Set" statement | | | | | | * |

A - file DB2TEST.DAT, create database statement.
B - file DB2TEST.DAT, create table statement.
C - file DB2TEST.DAT, comment on statement.
D - file TOTTEST.DAT, BEGIN-DATA-BASE-GENERATION statement.
E - file TOTTEST.DAT, DATA-SET-NAME statement.
F - file TOTTEST.DAT, "LK" fields.

The steps outlined in section 5.3 show the correspondence between the test and the functional requirements as listed in this section. These functional requirements match those as specified in the Translator Development Specification.

## 4.2 Testing Methods and Constraints

The tests as outlined in section 5.3 must be followed. The required input is stated for each test. This testing tests the normal mode of operation of these functions and does not completely exercise all the error combinations that a user of the Translator might create by faulty entry of form field information. These tests have been done, however, through the normal testing done by the developer of these functions. It is suggested that on further running of this test scripting of the test be done and the output from running the script be saved for future testing. No additional constraints are placed on this unit test besides those listed in section 3.3 of this unit test plan.

## 4.3 Test Progression

The progression of testing of the Translator is fully outlined in section 5.3 of this unit test plan. This progression should be followed exactly to insure the successful testing of this IISS configuration item.

## 4.4 Test Evaluation

The test results are evaluated by comparing the information returned on the various output screens to that specified as successful for the given test. As outlined in section 5.3, each test of Translator functionality provides an input screen with the required data entry specified and the resulting output for a successful test. To speed up testing of future releases, scripting may be used.

# SECTION 5

# TEST PROCEDURES

## 5.1 Test Description

A general description of this unit test is provided in section 5.3.

## 5.2 Test Control

As outlined, this unit test is a manual test which may be done by anyone familiar with the IISS. The required input data are documented for each function being tested and the resulting successful output is also documented. The order of the testing is also completely documented. The test control information is completely described in section 5.3. Accurate observation of the resulting successful output must be made to ensure the unit test was done properly.

## 5.3 Test Procedures

Below is an example of how the Translator may be invoked in the VAX/VMS environment. To run the unit test plan as outlined one must be logged on to an IISS account. The NTM must be up and running and the UI group logical names IISSFLIB, IISSULIB and IISSMLIB must be set properly. IISSFLIB points to the directory containing form definitions (FD files). IISSULIB is set to the current directory, the NTM environment directory. IISSMLIB points to the directory containing error messages (MSG files). The function key definitions are documented in Appendix A for a VT100.

Assuming the NTM is up and running, an IISS user may start the test using scripting as follows:

```
$ SET DEF <directory containing NTM environment>
$ VT100 -RTRANUTP.SCP
```

### 5.3.1 Access to IISS

Following entry of the system command "VT100" which activates the User Interface, the form in Figure 5-1 is displayed.

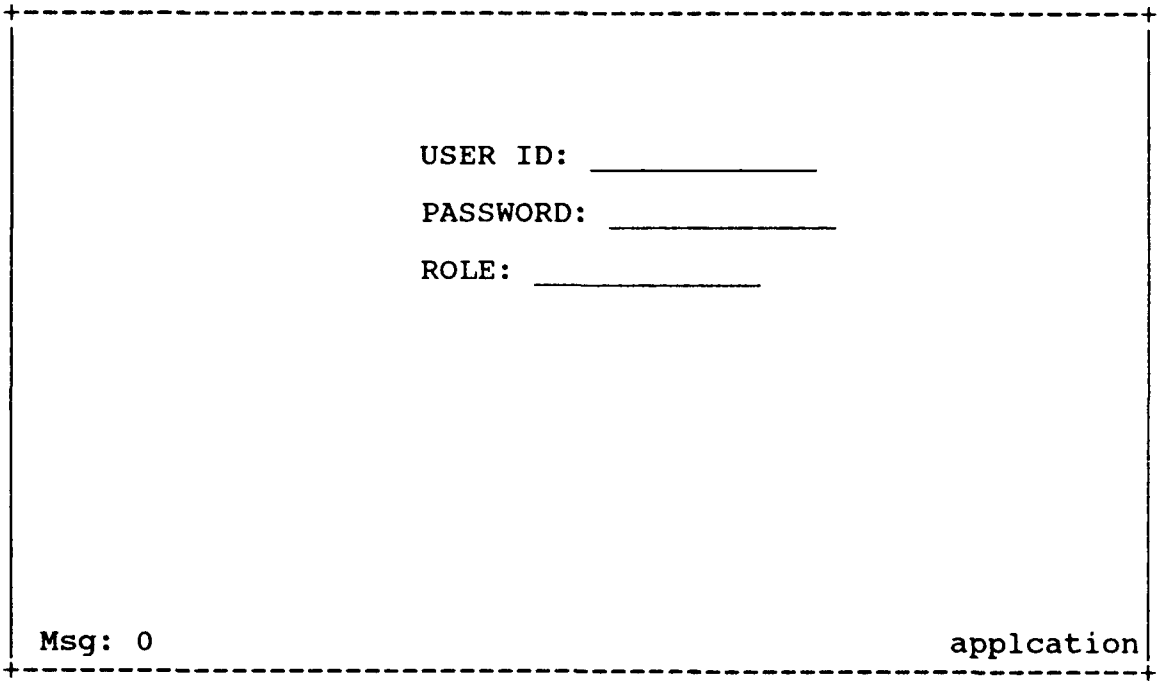


Figure 5-1 IISS Logon Screen

(1) USER ID is the identification name of the user, and is 1 to 10 alpha-numeric characters. USER ID is input as "MORENC".

(2) PASSWORD must be the password associated with the USER ID, and is 1 to 10 alpha-numeric characters. PASSWORD is input as "STANLEY".

(3) ROLE is any of the identifiers which are associated with the USER ID, and is 1 to 10 alpha-numeric characters. It is checked against functions and applications which are selected by the user. ROLE is input as "MANAGER". When this form is correctly completed and the <ENTER> key is pressed, the screen in Figure 5-2 is displayed.

### 5.3.2 Choosing the Translator Function

Specific applications are accessed through the form displayed in Figure 5-2. When the form appears, the cursor is located in the item FUNCTION. The items in the form are summarized below:

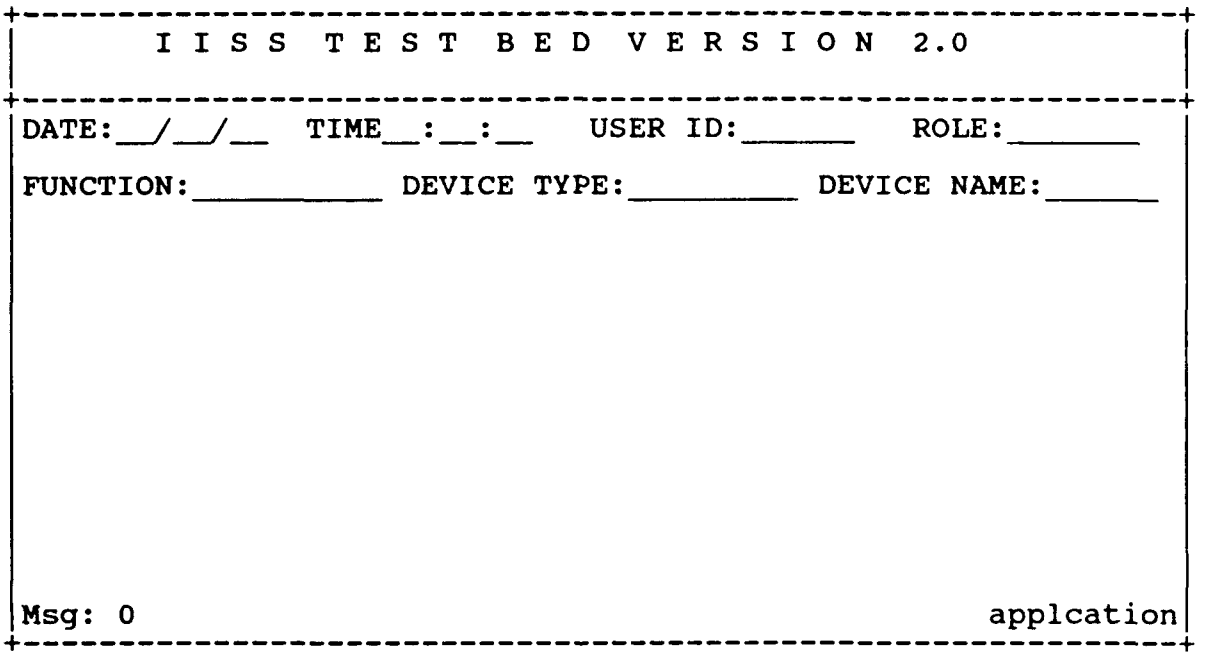


Figure 5-2 IISS Function Screen

(1) DATE contains the current date. This may not be changed by the user.

(2) TIME contains the current time. This may not be changed by the user.

(3) USER ID is the user's identification that was entered in the previous form. This may not be changed by the user.

(4) ROLE is the currently active role and was entered in the previous form. This may be changed at any time.

(5) FUNCTION is the function the user desires to activate. For this test type "DB2TRANZ" and press the <ENTER> key. The screen in Figure 5-3 is displayed.

### 5.3.3 Running the DB2 Translator

Figure 5-3 illustrates the input screen when the Translator is run. The fields are explained below.

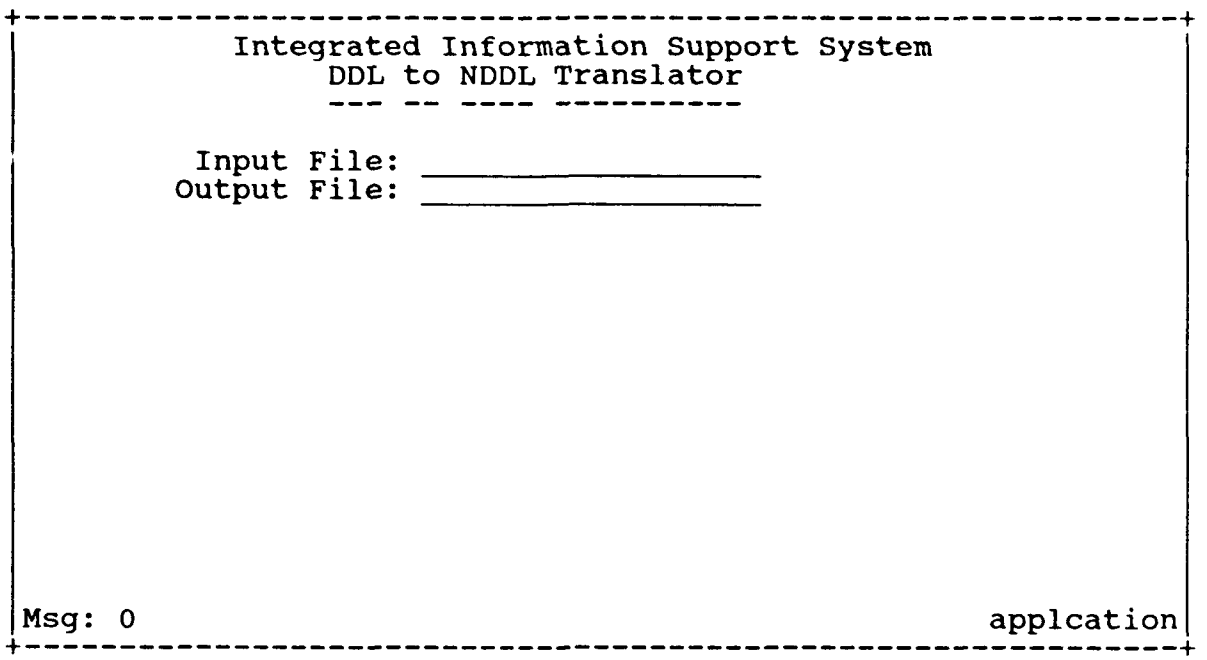


Figure 5-3 Translator Input Screen

1) Input File is the name of the file containing the DB2 test. Enter "DB2TEST.DAT".

2) Output File is the name of the file which is to contain the NDDL translation of the input DB2. Enter "DB2TEST.OUT".

The IISS Function Screen is displayed when the Translator terminates.

### 5.3.4 Running the TOTAL Translator

In the IISS Function Screen function item enter "TOTTRANZ". The screen shown in Figure 5-3 is displayed. In the Input File field enter "TOTTEST.DAT". In the Output File field enter "TOTTEST.OUT". The IISS Function Screen is displayed when the Translator terminates. Press the <quit> key.

### 5.3.5 Comparing the Results

Use the VAX/VMS utility DIFFERENCES to compare the output of the translators with the configuration management versions (file extension is .SAV).

For DB2:

```
$DIFF DB2TEST.SAV    DB2TEST.OUT
```

For TOTAL:

```
$DIFF TOTTEST.SAV   TOTTEST.OUT
```

There should be no differences for a successful test.

# APPENDIX A

## VT100 KEYPAD LAYOUT

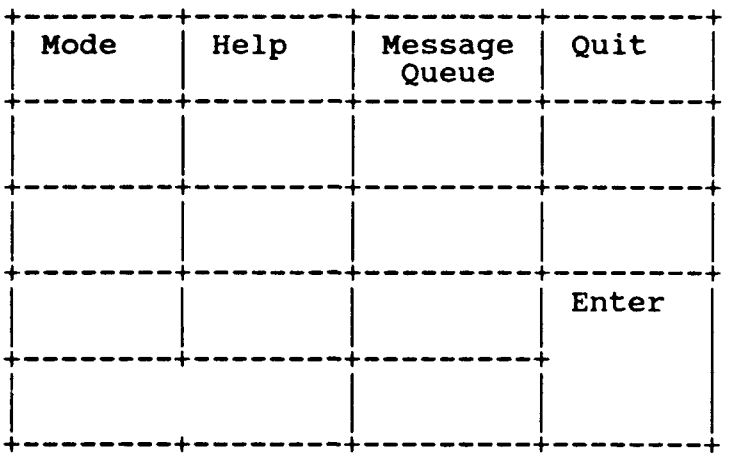


Figure A-1 Translator Function Keys (applcation mode)

# APPENDIX B

## DB2 TRANSLATOR TEST FILE

The following is the text of the file "DB2TEST.DAT" which contains DB2 commands to test the Translator.

```
CREATE DATABASE DSN8DPRG STRGROUP DSN8G000 BUFFERPOOL BP2;

CREATE DATABASE DSN8TEMP;

CREATE TABLE TEST
     (INTTEST                  INTEGER,
     SINTTEST                  SMALLINT,
     FLOTEST                   FLOAT,
     DECTEST                   DECIMAL,
     DECNTEST                  DECIMAL(2),
     DECNMTEST                 DECIMAL(2,1),
     CHARTEST                  CHAR(10),
     VCTEST                    VARCHAR(10),
     LVCTEST                   LONG VARCHAR,
     GRATEST                   GRAPHIC,
     VGTEST                    VARGRAPHIC,
     LVGTEST                   LONG VARGRAPHIC
     )
     IN DATABASE DSN8DAPP;

CREATE TABLE DSN8.TDEPT
     (DEPTNO                   CHAR(3)     NOT NULL,
     DEPTNAME                  VARCHAR(36) NOT NULL,
     MRGNO                     CHAR(6)     NOT NULL,
     ADMRDEPT                  CHAR(3)     NOT NULL
     )
     IN DSN8DAPP.DSN8SDEP;

COMMENT ON TABLE DSN8.VDEPT
     IS 'VIEW OF TABLE DSN8.TDEPT';

COMMENT ON COLUMN DSN8.TDEPT.DEPTNO
     IS 'DEPARTMENT ID - UNIQUE';
```

# APPENDIX C

## TOTAL TRANSLATOR TEST FILE

The following is the text of the file "TOTTEST.DAT" which contains TOTAL commands to test the Translator.

```
BEGIN-DATA-BASE-GENERATION:
DATA-BASE-NAME=ORDRDB
SHARE-IO:
IOAREA=MAS1
IOAREA=MAS2

BEGIN-MASTER-DATA-SET:
DATA-SET-NAME=CUST
IOAREA=MAS1
MASTER-DATA:
CUSTROOT=8
CUSTCTRL=6
CUSTNAME=30
.1.CUSTADDR
.2.CUSTSTR=10
.2.CUSTCITY=21
.2.CUSTSTAT=2
CUSTCTYS=20
CUSTLKCO=8    LINK TO CUSTOMER ORDER HEADER RECORDS
CUSTLKAR=8    LINK TO ACCOUNTS RECEIVABLE
END-DATA:
DEVICE=3330
TOTAL-LOGICAL-RECORDS
END-MASTER-DATA-SET:

BEGIN-VARIABLE-ENTRY-DATA-SET:
DATA-SET-NAME=ACCR
IOAREA=VAR1
BASE-DATA:
ACCRCODE=2
ACCRCUST=6
CUSTLKAR=8
ACCRSEQ=2
ACCRDAT1=45
RECORD-CODE=BL
ACCRINUM=6
ACCRNDAT=4
ACCRNAMT=5
ACCRGAMT=4
ACCRPAID=5
RECORD-CODE=CK
ACCRRINO=6
ACCRCHKN=6
ACCRDREC=4
CUSTLKCO=8
ACCRCAMT=5
*FILLER*=16
END-DATA:
DEVICE=3330
TOTAL-LOGICAL-RECORD=12000
END-VARIABLE-ENTRY-DATA-SET:
END-DATA-BASE-GENERATION:
```



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